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U.S. Patent Application:

Title: **EXECUTION SETS FOR GENERATED LOGS**

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Execution Sets for Generated Logs

Field of the Invention

This invention relates in general to network diagnostics, and more particularly to a network administration system for automatically executing instruction sets in response to generation of error logs in a network.

Background of the Invention

It is well known in traditional computer and digital communication networks for technicians to respond to the generation of error logs by notifying affected users of system problems, analyzing and then fixing the problems using an assortment of software commands and/or tools. The use of such software commands is often repetitive and requires the technician to manually enter the commands upon each observation of a specific log.

Summary of the Invention

According to the present invention, a network administration system is provided for automatically executing instructions programmed by the technician in response to receipt of particular logs. Thus, the technician is relieved of the requirement to manually and repetitively entering commands to correct repeated errors. Accordingly, the network administration system of the present invention may be advantageously used to implement automated self-repairing networks.

Brief Description of the Drawings

A detailed description of the preferred embodiment is set forth herein below with reference to the following drawings, in which:

Figure 1 is a block diagram of an exemplary network incorporating the system of the present invention;

Figure 2 is a table of a set of rules that have been defined for use in the network of Figure 1;

Figure 3 is a table showing an exemplary list of logs generated by the network of Figure 1;

Figure 4 shows a graphical user interface for associating execution sets with logs; and

Figure 5 is a flowchart showing process flow of the network administration system according to the preferred embodiment.

Detailed Description of the Preferred Embodiment

Traditionally, system error logs have been analyzed through human intervention in order to determine the sources of and to correct system errors. Thousands of logs can be generated by a single problem. For example, if a T1 line goes down, error logs could be generated by thousands of phones that cannot find a dial tone. It is known in the prior art to automatically filter error logs through "rule sets" to determine if a combination of logs satisfies a given criteria. One example of such an automated process is a product from Plexis (http://www.triadhc.com/edi.shtml) called Plexis EDI Toolkit. If the criteria is satisfied, it is known in the art either to generate a further log or to provide an overall summary for describing the problem to the technician. Thus, it is known to generate Higher Level Logs (HLL) from Lower Level Logs (LLL) in response to predetermined rule sets being satisfied The Lower Level Logs (LLL) are generated by network applications or devices. Such systems are valuable because the HLLs help to explain to the system administrator/designer what is really going on in the system.

There are instances where HLL's generate more HLL logs, or combinations of LLL's and HLL's generate new HLL's. Since HLL's are generated by LLL's and possibly other HLL's, the technician needs to see how the HLL's are triggered since rule-sets can be complex and not easily understood.

According to the present invention, each of these types of logs can be associated with a set of execution instructions. Preferably, the execution sets are implemented as software applications (e.g. shell scripts, command function utilities, etc.) that read each command line and execute its instructions. Thus, specific execution sets may be implemented on many levels of network/system analysis and repair.

Figure 1 shows a typical network comprising a plurality of phones (P2 to P4) connected to a server implemented PBX (PBX 1), a further phone P1 connected to a client server C1, both the client C1 and PBX 1 being connected to a PBX2. The PBX 2 is connected to a T1 trunk in a well known manner. Each of the devices shown in Figure 1, with the exception of the trunk, has the capability of generating logs to inform a technician of the device status. The network configuration is for illustration purposes only, and may incorporate a host of other devices and networks.

As indicated above, Figure 2 demonstrates a set of rule sets that are defined for use in the network of Figure 1, and Figure 3 shows a typical list of logs (HLL's and LLL's) that are generated from the network of Figure 1 as well as associated execution sets when these logs are produced. The execution set does not form part of the error log, which is restricted to the Log ID, Time Generated and Brief Description. The system parses the Brief Description in order to identify the source of a particular error log.

According to the invention, a network administration system is provided for entering execution sets which are designed to execute specific commands in response to receiving a log in connection with which such an execution set has been programmed. In Figure 1, the inventive system is incorporated into PBX 2. Alternatively, the network administration system may be implemented in a separate server connected to the network.

As shown in Figure 4, a user interface is provided for associating logs with execution sets. Each command is entered into a text box relative to the associated log. The execution sets may be associated with each type of log in the software package that coordinates the logs and the execution sets. When a rule set has been satisfied, the log associated with that rule set is compared to a logs list in the execution set software application and the corresponding command line in the execution set is executed.

For the illustrated example, error logs P6000, P6001 and P6002 are generated by devices in the network, resulting in creation of HLL001. According to the invention, an execution set has been programmed for P6001 to display "not fully functional" if the phone has an LED display, and an execution set has been programmed to page the technician and send a medium level alarm upon receipt of the HLL001 log.

The execution sets are triggered by using software tools (e.g. Visual Basic, C++) to read the logs and determine if the logs generated have an associated execution set, as shown in Figure 5. If there is an association, each command/service in the execution sets is triggered in order (as specified by the user) or simultaneously. Ordered triggering is set by the order of the command lines in an execution set. Thus, the first command in Figure 4 for LogPBX2000 is the CallPhone command line, the second command is the AlarmAgent command line. The user can change the order by clicking on a command line in an execution set and dragging it up or down.

Exemplary pseudo-code of the process for implementing the network admistration system of the present invention is as follows:

```
execution sets function prog
        retrieve log
        compare log with list of logs with execution sets
if log exists with an execution set
                go to first command line in execution set
                while command lines exist in execution set
                        execute command line in execution set
                        if more command lines exist
                                go to next command line
                        endif
                endwhile
        endif
```

end execution sets function prog

Alternatives and modifications of the invention are possible within the sphere and scope as set forth in the claims appended hereto.